

## **DISCUSS HOW REDUCED VISIBILITY AND TURBULENCE EFFECT SEARCH OPERATIONS**

### **CONDITIONS**

You are a Mission Scanner trainee and must discuss how reduced visibility and turbulence effect search operations.

### **OBJECTIVES**

Discuss reduced visibility and turbulence, and how they effect search operations.

### **TRAINING AND EVALUATION**

#### **Training Outline**

1. As a Mission Scanner trainee, understanding the causes of reduced visibility and turbulence and how this effects search operations is very useful.
2. Reduced visibility. One of the most common hazardous-weather problems is loss of visibility. Visibility may be reduced by many conditions including clouds, rain, snow, fog, haze, smoke, blowing dust, sand, and snow. A similar condition called "white out" can occur where there has been snowfall.
3. Effects. This can happen either suddenly or very insidiously, depriving the pilot of his ability to see and avoid other aircraft, and reducing or depriving him altogether of his ability to control the aircraft, unless he has had training and is proficient in instrument flying. In reduced visibility, the crew's ability to see rising terrain and to avoid towers, power transmission lines, and other man-made obstacles is diminished.

Frequently, as the sun warms the cool, hazy air and causes it to expand and rise, visibility at the surface will improve and appear acceptable. What initially appeared to be ample visibility can, after takeoff, become almost a complete obstruction to lateral or forward visibility several hundred feet above the surface. Downward visibility is satisfactory, but pilots may feel apprehensive about the loss of a visible horizon to help judge aircraft control, and about what might come out of the murk ahead. Visibility at this altitude may actually be more than the minimum three miles, yet the pilot may interpret this visual range as a wall just beyond the airplane's nose.

When haze and smoke are present, the best measure a flight crew can take to minimize risk of such an encounter is to get a thorough weather briefing before flying, and update the briefing by radio with *Flight Watch* as required.

Each member of the aircrew must be vigilant during all phases of the flight when visibility is less than perfect. Crew resource management requires that each member of the crew be assigned an area to search during the takeoff, transit and approach-to-landing phases of the flight in order to help the pilot "see and avoid" obstacles and other aircraft. The aircrew must also characterize visibility in the search area so as to establish the proper scanning range (see Chapter 5). Search visibility may be different than expected, and your search pattern may have to be adjusted accordingly. Be sure to cover this during your debriefing.

4. Turbulence. Turbulence is irregular atmospheric motion or disturbed wind flow that can be attributed to a number of causes. Turbulence can be inconsequential, mildly distracting, nauseating, or destructive depending on its intensity. Turbulence can often be avoided by changing altitudes. Aircraft manufacturers publish "maneuvering speeds" in the operating handbooks: if the aircraft stays below the maneuvering airspeed no structural damage should occur.

Just as a tree branch dangling into a stream creates continuous ripples or waves of turbulence in the water’s surface, obstructions to the wind can create turbulence in the air. This type of turbulence occurs mostly close to the ground, although depending upon wind velocity and the nature of the obstruction, it may reach upward several thousand feet. In an extreme case, when winds blow against a mountainside, the mountain deflects the wind upward creating a relatively smooth updraft. Once the wind passes the summit, it tumbles down the leeward or downwind side, forming a churning, turbulent down draft of potentially violent intensity. The churning turbulence can then develop into *mountain waves* that may continue many miles from the mountain ridge. Mountain waves may be a factor when surface winds are as little as 15 knots.

5. Effects. Turbulence can become a major factor in search effectiveness. Any scanner who is uncomfortable or nauseous cannot perform her duties at a very high level of effectiveness. If you experience these sensations, inform the pilot immediately. If turbulence detracted from your concentration during the search, be sure to mention this during debriefing.

**Additional Information**

More detailed information on this topic is available in Chapter 6 of the MART.

**Evaluation Preparation**

**Setup:** None.

**Brief Student:** You are a Scanner trainee asked to discuss turbulence and its affects on search operations.

**Evaluation**

<u>Performance measures</u>	<u>Results</u>	
1. Discuss the causes of reduced visibility.	P	F
2. Discuss how reduced visibility effects search operations, and related precautions.	P	F
3. Discuss the causes of turbulence.	P	F
4. Discuss how turbulence effects search operations, and precautions.	P	F

Student must receive a pass on all performance measures to qualify in this task. If the individual fails any measure, show what was done wrong and how to do it correctly.